FORTINET

An OpenBTS GSM Replication Jail for Mobile Malware

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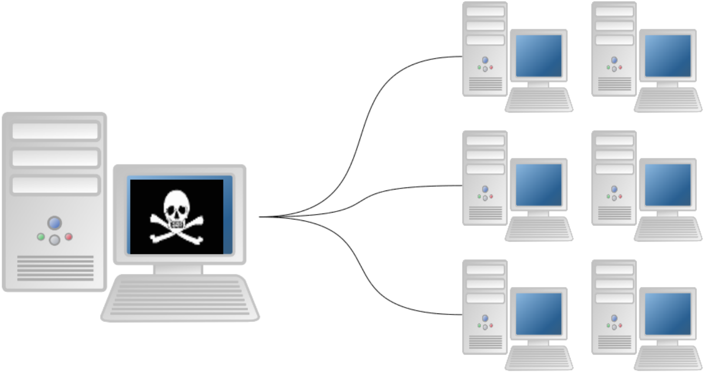
Virus Bulletin Conference, October 2011

Malware Jail



Thou Shalt Not Spread (Nor Leak)

Malware Jail

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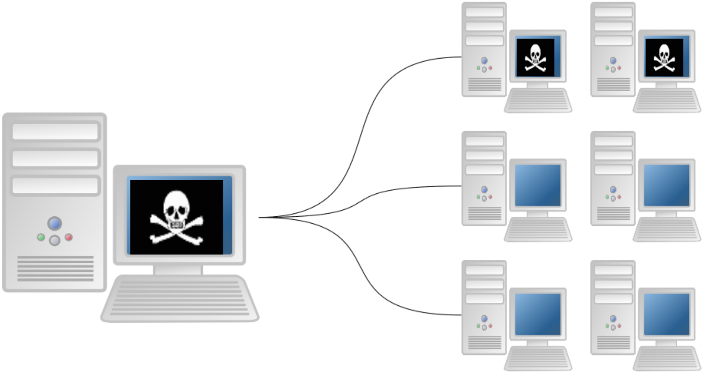

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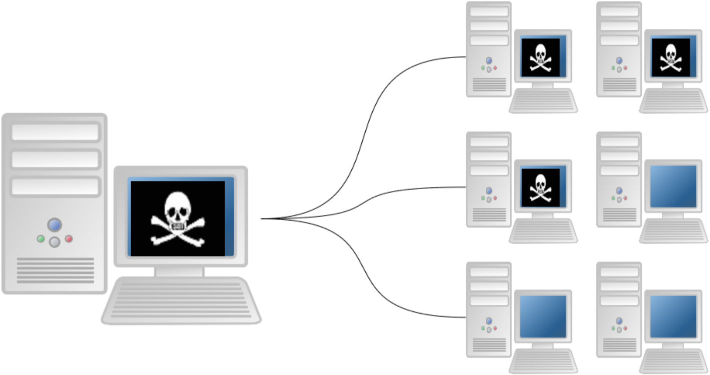

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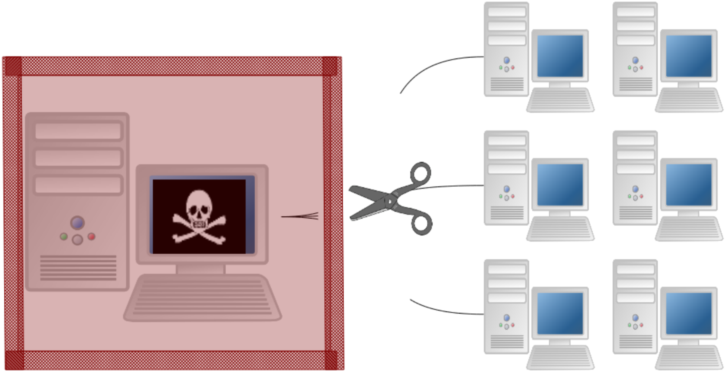

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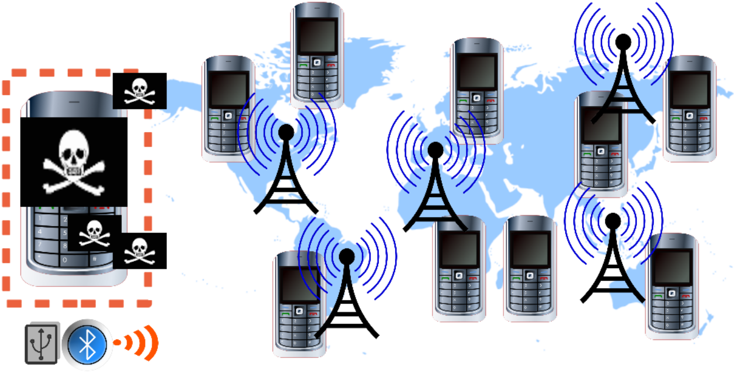
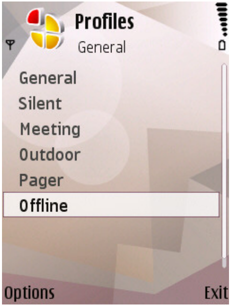


Thou Shalt Not Spread (Nor Leak)

Jail 1. Remove SIM/ Offline/ Flight mode

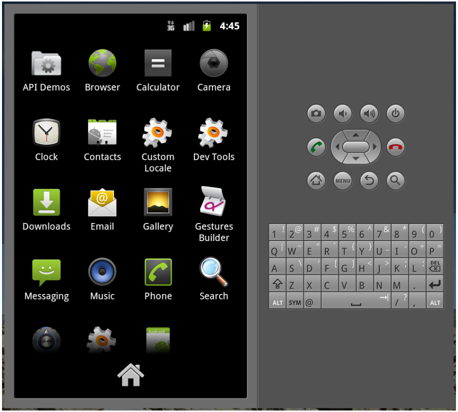


- Secure... probably
- Behaviour: changed!

Malware Name	Online	Offline
SymbOS/Album	Sends 2 SMS	-
SymbOS/Acallno	Trojan spyware	Can't be activated
SymbOS/Feixiang	Sends 2 SMS	Sends 1 SMS
Java/Konov, SymbOS/-ZoomSms	Sends SMS	System lag

Jail 2. Use an emulator

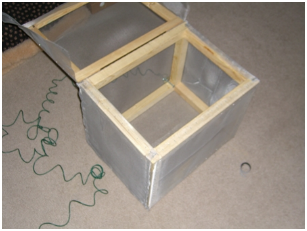
- Good Android emulator, but other OS?
- Same behaviour change problem
- Hardware exploits/ VM detection



Jail 3. Faraday cage

Not that easy to build...

Jail 3. Faraday cage

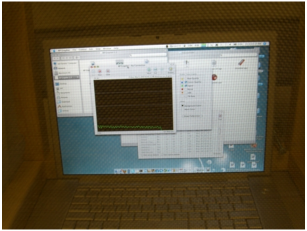


Courtesy of J. Daniels
http://www.jeddaniels.com/2007/faraday-cage-part-1/

Not that easy to build...

- How to see the screen?

Jail 3. Faraday cage



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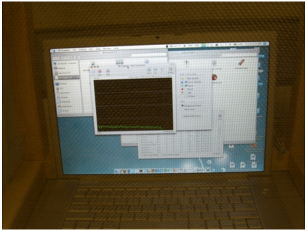

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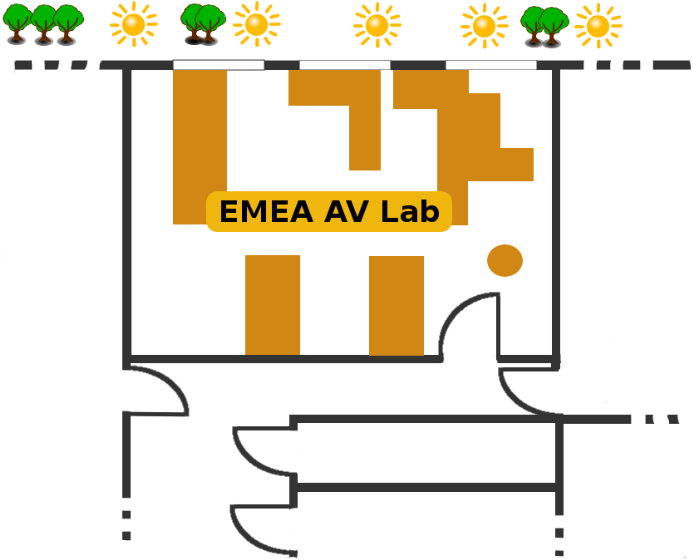
Not that easy to build...

- How to see the screen?
- Access to keyboard?

Large Faraday cages

Expensive + Weight

Build your own operator network!



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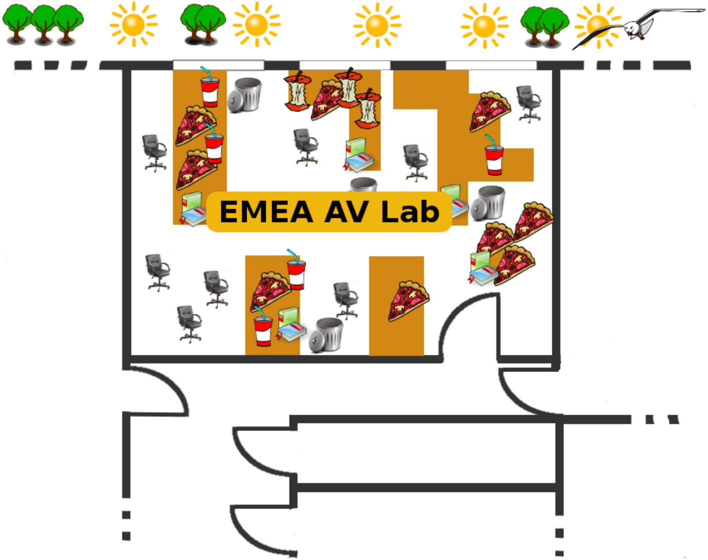

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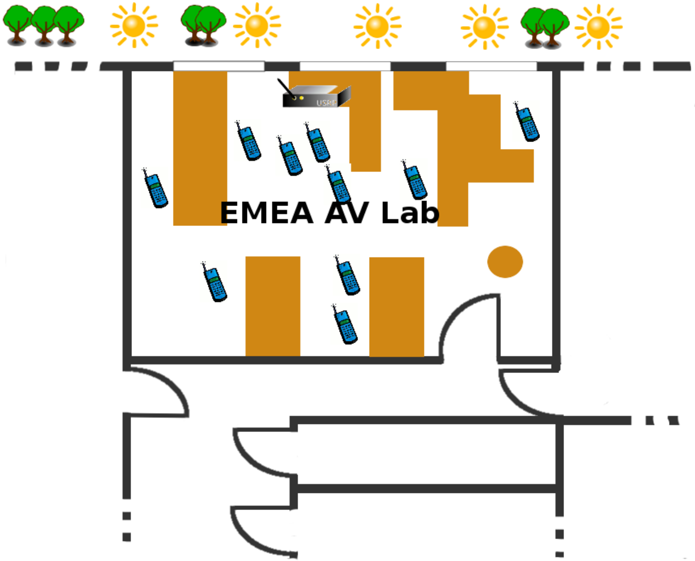

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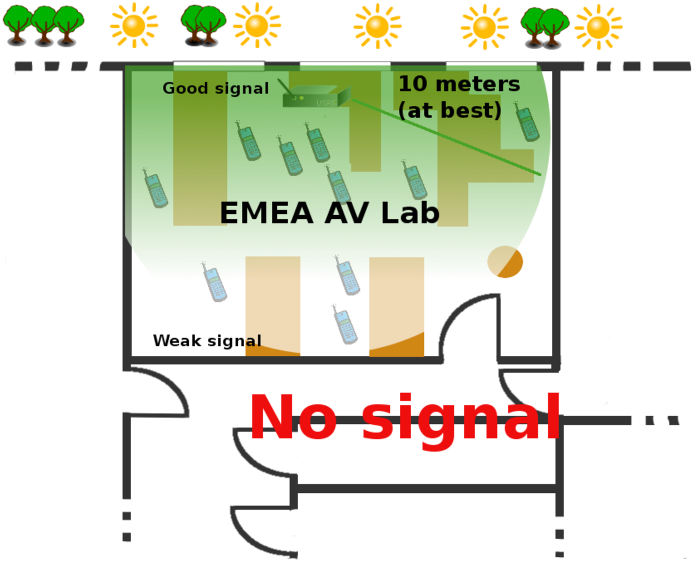

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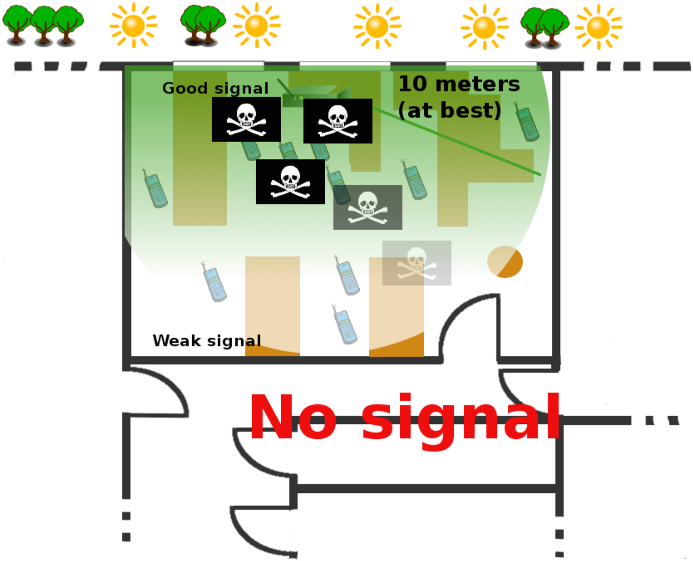


What's OpenBTS?

OpenBTS

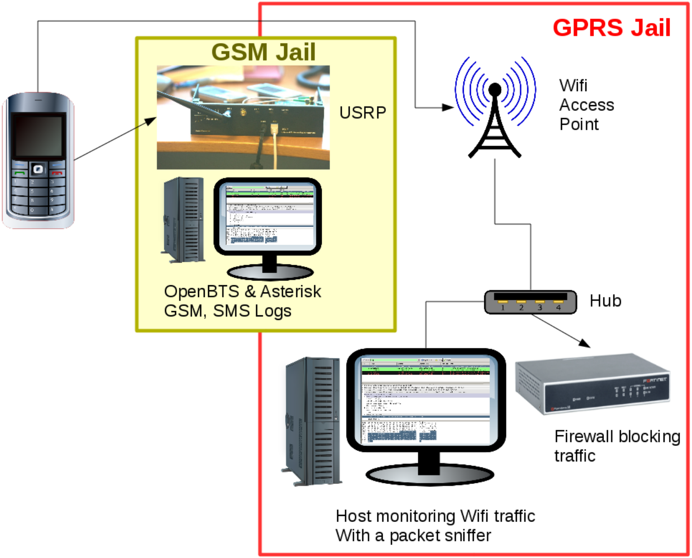
- Open source project
- Local GSM operator = USRP + accurate clock + host running OpenBTS / Asterix
- No GPRS, EDGE, UMTS...

OpenBTS is a registered trademark of Range Networks, Inc.

And nanoBTS-OpenBSC?

Good (perhaps better?)... but 6 times more expensive

Jail Architecture



Video: Using an OpenBTS Jail for Malware Analysis

2103

Infected by Zitmo

2102

Attacker Intercepts SMS

2111

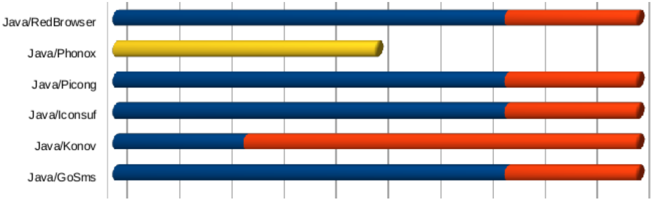
Genuine Friend / Bank Sends SMS to infected

What the analyst sees...

Part 1. ... when the phone is offline

Part 2. ... with an OpenBTS-based jail

Results



Blue: offline, Red: with GSM jail, Yellow: +GPRS jail.

Full results: see paper.

Main Advantages

- Behaviour similar to real conditions
- See SMS contents and details
- No leak to real networks
- Low cost

Limitations

- Sample requires a WCDMA bearer
- MMS not handled
- Dynamic analysis limitations

Thank You !

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